

# Appendix E: Environmental Consequences Methodologies

## Introduction

This chapter describes the probable consequences (or impacts) that could result under the alternatives described in this Environmental Assessment. The chapter is divided into three parts. The Introduction section describes methodologies and assumptions common to all resource topic areas. The Methodologies and Assumptions section presents the methodologies used to assess impacts on each specific resource topic. The next section describes the impacts anticipated under each alternative, organized by resource topic. Environmental impacts are summarized in Table II-2: Summary of Environmental Consequences, located at the end of Chapter II, Alternatives, of this document.

## Impact Analysis

An Impact Analysis section is presented for each individual resource topic, under each alternative. Impacts are evaluated based on context, duration, intensity and whether they are direct, indirect, or cumulative. In addition, impairment to park resources and values is considered. Alternative 1 (the No Action Alternative) describes the status quo. This alternative provides a baseline from which to compare other action alternatives, to evaluate the magnitude of proposed changes, and to measure the environmental affects of these changes.

The following guidelines were used to identify the context, duration, intensity (or magnitude) and type of impact.

- **Context.** The context considers whether the impact would be local or regional. For the purposes of this analysis, local impacts would be those that occur within the immediate vicinity of the Yosemite Lodge Area Redevelopment and regional impacts would be those that occur in Yosemite Valley, unless otherwise noted.
- **Duration.** The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration. Long-term but temporary impacts are noted as such in the impact analysis, and result from the 13-year duration of the construction period.
- **Intensity.** Indicators of the intensity of an impact, whether it is negligible, minor, moderate, or major, are included in the impact analysis and specifically defined by topic area in the methodology section that follows.
- **Type.** The type of impact refers to whether the effect is considered beneficial or adverse. Beneficial impacts would improve resource conditions. Adverse impacts would deplete or negatively alter resources. Mitigating actions listed in Chapter II would be taken during implementation of the action alternatives.

## **Cumulative Impacts**

The Council on Environmental Quality (CEQ) describes a cumulative impact as follows (Regulation 1508.7):

*A “Cumulative impact” is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

The cumulative projects addressed in this analysis include past actions, present actions, as well as any planning or development activity currently being implemented or planned for implementation in the reasonably foreseeable future. Cumulative actions are evaluated in conjunction with the impacts of an alternative to determine if they have any additive effects on a particular resource. Because most of the cumulative projects are in the early planning stages, the evaluation of cumulative impacts was based on a general description of the project. Appendix F, Cumulative Projects, contains the list of cumulative projects included in the cumulative impacts analysis.

## **Impairment**

Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. The need to analyze and disclose impairment impacts originates from the NPS Organic Act (1916), which established the National Park Service with a mandate “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

An impact would be less likely to constitute impairment if it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values (NPS 2000c). An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- Identified as a goal in the park’s *General Management Plan* or other relevant National Park Service planning documents

Impairment of park resources was evaluated on the basis of the type and intensity of impacts, and in terms of the types of resources affected. Overall, beneficial impacts would not constitute impairment. With respect to the intensity of impacts, negligible and minor adverse impacts are not of sufficient magnitude to constitute impairment. Moderate and major adverse impacts may constitute impairment, but do not automatically do so. Rather, these impacts must be analyzed with respect to the three bulleted criteria above. Impairment is generally considered for geologic, hydrological, biological, cultural, and scenic resources and recreation. Impairment is addressed in the conclusion section of each impact topic under each alternative.

## Methodologies and Assumptions

This section presents the methodologies and assumptions used to conduct the environmental impact analyses for each resource topic.

### ***Geology and Geologic Hazards***

This section focuses on potential damage from geologic processes such as earthquakes and rockfall. As a basis for the assessment, the major earthquake fault systems in the region were identified and mapped. The U.S. Geological Survey conducted mapping in Yosemite Valley to determine the location of the base of the talus, and the location of the rockfall shadow line (the distance calculated to determine outlying boulder locations beyond the extent of talus<sup>1</sup>). Based on active fault locations and rockfall susceptibility, several assumptions regarding facility placement, geologic design parameters, and public safety were integrated into this assessment, as summarized below.

- Geotechnical studies to determine soil stability conditions would be performed prior to placing, designing, or locating facilities, and facility design would conform to building code seismic design parameters.
- The National Park Service is currently revising its management policies pertaining to geologic resources and hazards. The focus of these guidelines will be to protect visitors, employees, and infrastructure from geologic hazards and to locate facilities out of geologically hazardous areas. All new facility design and construction would conform to the revised management policy, when released.
- Geologic risks that affect public safety are rarely predictable, and the extent to which they may affect people and property cannot be quantified. Analysis of effects was qualitative, and professional judgment has been applied to reach reasonable conclusions as to the context, duration, and intensity of potential impacts.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration. Generally, geologic impacts related to seismic events and rockfalls would be long-term and permanent.

### **Intensity of Impact**

The intensity of an impact was based on its location within the park and what the types of activities and facilities are proposed in that location. The intensity of the impact would be negligible if facilities of any kind are located outside geologic hazard zones.

The intensity of the impact would be considered a minor risk if standard occupancy and miscellaneous facilities are within the shadow line zone. The intensity of the impact would be moderate if essential, hazardous, and special occupancy facilities are within the shadow line zone, or standard occupancy and miscellaneous facilities are within the base of talus zone. The intensity

<sup>1</sup> The shadow line is determined by a procedure based on the apex of the talus and a minimum shadow angle of 22 degrees.

of the impact would be considered major if essential, hazardous, and special occupancy facilities are within the base of talus zone.

There will always be a potential for adverse impacts to life and property due to seismic hazards, especially in developed areas. Therefore, management actions to avoid placement of facilities in areas susceptible to seismic hazards may decrease the risks but would not necessarily reduce the intensity of the impact.

### **Type of Impact**

All seismic events are potentially hazardous. The type of impact is related to risk, and it is difficult to estimate risk involving natural events. In general, reducing risk is considered a beneficial impact. The type of impact would be considered beneficial if there would be a decrease in both the density of individuals and facilities from the base of talus zone; this includes moving them into the shadow line zone, a zone of lower risk. It would also be considered beneficial if there would be a decrease in both the density of individuals and facilities from the shadow line zone.

Generally, maintaining facilities within or moving facilities into a zone of higher risk or exposing people to greater levels of risk was considered adverse. Specifically, the type of impact would be considered adverse if (1) essential and hazardous occupancy facilities remain in or are placed in the base of talus and shadow line zones; or (2) special occupancy facilities remain or are placed in the base of talus zone.

### **Soils**

This document analyzes impacts to soils in undeveloped natural zones, and restoration of impacted soils. Impacts to soils in currently developed and hardened sites are excluded from the analysis.

Information regarding soils was developed by the Natural Resources Conservation Service as part of a parkwide soil survey that began in 1995. This survey is expected to be complete in 2003. Data provided from this survey were considered provisional. Soil mapping units have not yet been developed, and at times park staff have extrapolated data from existing mapped soil units nearby to examine affected areas. Other soil data were obtained from the following soil surveys: (1) Soil Survey of Sierra National Forest Area, California (USFS 1993), (2) Soil Survey of Mariposa County Area, California (Soil Conservation Service 1974), (3) Soil Survey of Tuolumne Meadows Study Area, Yosemite National Park (NRCS 1995b) and (4) Soil Survey of High Sierra Area, California (NRCS 1995a).

Types of soil impacts include soil removal, soil profile mixing, soil compaction, soil erosion, soil contamination, and soil restoration and revegetation activities. Activities that may result in soil impacts include the construction of buildings, parking areas, roads, trails, and other facilities.

- **Soil Removal.** Paving activities and building construction remove and cover the soil surface and result in significant changes to the basic soil properties of the topsoil. Excavation and removal of the soil surface would result in a long-term impact because the basic soil properties, which have taken thousands of years to develop, would have been removed. Covering the surface reduces water movement and minimizes the opportunity for the normal processes of physical transport and chemical transformations, such as illuviation, eluviation and nutrient cycling.

- **Soil Profile Mixing.** Soil excavation and redistribution results in removal or mixing of the soil profile and disrupts soil structural characteristics, interrupting the chemical, physical, and biological processes that naturally occur in the soil. The level of change is dependent on the level of the alteration. It may be many years before the soil profile would redevelop.
- **Soil Compaction.** Soil compaction may occur as a result of construction activities or in areas of intensive use such as trails, campgrounds and picnic areas. Wetland soils are very susceptible to compaction effects. Soil compaction reduces infiltration rates, thereby increasing surface runoff and the potential for erosion. Deep compaction of soils may impede subsurface flow. In turn, these effects could alter soil chemical processes such as nutrient transfer, biological processes such as root development and microbial patterns, and physical processes such as soil structure. Vegetation growth on compacted soils is often limited due to low infiltration and poor root penetration.
- **Soil Erosion.** Removal of vegetation through grading activities or pedestrian use may result in accelerated erosion of the soil surface. Soils on steep slopes and along watercourses are especially susceptible to erosion.
- **Soil Contamination.** The addition of chemical constituents into the soils as a result of pavement installation, untreated runoff from paved surfaces, or from incidental spills, may alter micro- or macro-organism populations, diversity, and dynamics. Machinery involved with construction activities may deposit small amounts of natural and synthetic petrohydrocarbons onto soils through equipment failure or normal operations.
- **Soil Restoration.** Ecological restoration that would minimize erosion potential and increase organic matter in the soil would be considered a beneficial effect. Short-term adverse effects may occur during site restoration activities where construction equipment may compact soils, temporarily eliminate groundcover vegetation, and cause potential erosion from surface water runoff over the exposed soils.

### Duration of Impact

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### Intensity of Impact

The evaluation of the intensity of impacts on soils focuses on hydric soils, resilient soils, and other soils. Hydric soils commonly form in wetlands and can be associated with rare, threatened, or endangered plants. Hydric soils usually form under sufficiently wet conditions to develop anaerobic conditions and support hydrophytic vegetation. Hydric soils are protected by wetland protection policies such as Executive Order 11990 Protection of Wetlands and NPS Director's Order #77-1, *Wetland Protection*.

Resilient soils are more capable of withstanding alteration without permanent deformation. These soils tend to be able to recover more quickly from alteration. Generally, these soils do not have major use limitations or severely restrictive physical attributes.

Soils classified as "other" include those that are not identified as hydric or resilient soils. Generally, these soils have more limitations on use because of steep slopes or other physical attributes. They may require more intensive management or engineered mitigation measures for

development, as compared to resilient soils. “Other” soils are generally more abundant or do not support plant communities that are rare or especially diverse.

Impact intensity has been characterized as negligible, minor, moderate, or major. Definitions of impact intensities for various soil types are provided in table E-1, below.

**Table E-1**  
**Soil Impact Intensity Definitions**

Soil Type	History of Disturbance	Size of Impact			
		Small Scale (1 to 5 acres)	Small but Measurable (5 to 10 acres)	Measurable and Moderate Scale (10 to 20 acres)	Large Scale (>20 acres)
Resilient Soils	Previously Disturbed	Negligible	Negligible	Minor	Moderate
	Undisturbed	Negligible	Minor	Moderate	Moderate
Other Soils	Previously Disturbed	Negligible	Minor	Moderate	Moderate
	Undisturbed	Minor	Moderate	Moderate	Major
Wetland Soil	Previously Disturbed	Moderate	Moderate	Major	Major
	Undisturbed	Moderate	Major	Major	Major

### Type of Impact

Beneficial impacts to soils would be those that protect or restore natural soil conditions including abiotic and biotic components, soil structure, and moisture. Adverse impacts would result in degradation of chemical, physical, abiotic, or biotic soil components.

### Floodplains

National Park Service policy is to protect natural floodplain values and functions, and to minimize risk to life or property by avoiding the use of the regulatory floodplain whenever there is a feasible alternative location. Impacts are evaluated in this section based on the potential to avoid loss of life and property during major floods. The Water Resources section addresses potential impacts on floodplain values and hydrology.

The National Park Service manages floodplains in accordance with Executive Order 11988, Floodplain Management, and the Director’s Order #77-2, Floodplain Management. The regulatory floodplain is defined as the 100-year, 500-year, or maximum possible flood depending on the type of activity and the amount of risk inherent in the nature of flooding at a location. Generally, the regulatory floodplain is the 100-year flood for most park functions in environments like Yosemite Valley. The 100-year floodplain in Yosemite Valley is based upon the January 1997 flood event. For critical actions such as schools, hospitals, and large fuel storage facilities, the regulatory floodplain is defined as the 500-year floodplain. Some facilities such as picnic areas and day-visitor parking are exempt from the National Park Service guidelines because they are often located near water for the enjoyment of visitors and do not involve overnight occupation.

When there is no practicable alternative to placement of facilities in a floodplain location, National Park Service policy permits the use of the floodplain when there are compelling reasons for doing so, when the level of impact to natural floodplain processes is acceptable, and when mitigation is provided to protect human life and property. A statement of findings must be written to document a decision to place facilities within a floodplain.

## Duration of Impact

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

## Intensity of Impact

Beneficial and adverse impacts of individual actions in each alternative were assigned intensities as they relate to effects on life/safety and property in the floodplain. Definitions of impact intensities are provided in table E-2, below.

**Table E-2  
Floodplain Impact Intensity Definitions**

Intensity	Evaluation Factors			
	Presence of People in Floodplain	Ease of Flood Evacuation	Number of Structures in Floodplain	Flooding Damage to Property
Negligible	Daytime only (few to none)	Easy	Few to none	No damage likely
Minor	Daytime only (may be numerous)	Easy	Few	Slight damage possible
Moderate	Overnight	Easy	Medium	Severe damage possible
Major	Overnight	Difficult	Numerous	Severe damage likely

## Type of Impact

The removal of structures from the 100-year floodplain was considered a beneficial impact to human life or property. Development of new Class I or Class II actions (non-exempted facilities)<sup>2</sup> in the 100-year floodplain was considered an adverse impact to human life or property.

## Water Resources

Impacts on hydrology, floodplain values, and water quality are discussed under this resource topic. Hydrology refers to hydrologic processes such as flooding, erosion and deposition, and channel movement. Particular attention is given to alterations or restoration of water flow (e.g., placement or removal of facilities in the Merced River channel). Floodplain values are attributes of flooding that contribute to ecosystem quality, such as recharge of riparian ground water. Particular attention is given to alterations or restoration of the floodplain (e.g., placement or restoration of facilities in a floodplain). Water quality refers to the suitability of surface water for recreational use and wildlife habitat, particularly the enhancement or degradation of water quality. The National Park Service *Freshwater Resource Management Guidelines* (found in NPS-77) requires the National Park Service to “maintain, rehabilitate, and perpetuate the inherent integrity of water resources and aquatic ecosystems.” The Clean Water Act requires the National Park Service to “comply with all Federal, State, interstate, and local requirements,

<sup>2</sup> Class I Actions include administrative, residential, warehouse and maintenance buildings, and overnight parking facilities. Class II Actions include facilities such as schools, hospitals, fuel storage facilities, and emergency services.

administrative authority, and process and sanctions respecting the control and abatement of water pollution.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent

### **Type of Impact**

Adverse impacts alter natural hydrologic conditions (e.g., impede flood flows, cause unnatural erosion or deposition, etc.) or degrade water quality (e.g., increase pollution or bacteria levels from recreational use). Beneficial impacts are those that restore natural hydrologic conditions (e.g., remove impediments to flood flows, stabilize riverbanks, etc.) or improve water quality (e.g., reduce non-point source pollution).

### **Context of Impact**

Localized impacts would occur in the immediate vicinity of an action or in a nearby area indirectly affected by the action (e.g., radiating impacts of concentrated visitor use). Regional impacts would occur over a large area, such as Yosemite National Park or the Sierra Nevada. Many water quality impacts are regional because an action could potentially affect water quality downstream.

### **Wetlands**

The results from a wetland delineation conducted by Jones and Stokes in 2002 were used to evaluate impacts on wetlands. These results, which indicate the location of wetlands, were compared to each action alternative to determine the area of potential impact.

The wetland protection statutes that guide the National Park Service include Executive Order 11990, *Protection of Wetlands*; Director's Order #77-1, *Wetland Protection*, and its accompanying Procedural Manual #77-1; and Clean Water Act Sections 10 and 404; and the "no net loss" goal outlined by the White House Office on Environmental Policy in 1993. Executive Order 11990 requires agencies to minimize the destruction, loss, or degradation of wetlands. National Park Service's Director's Order #77-1 and Procedural Manual #77-1 provide specific procedures for carrying out Executive Order 11990. Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act authorize the U.S. Army Corps of Engineers to grant permits for construction and disposal of dredged material in waters of the United States. This analysis considers whether proposed actions could breach applicable federal laws, regulations, or executive orders.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

Three primary measures were used to evaluate the intensity of impacts on wetlands: the size and type of the wetland, the integrity of the wetland, and the connectivity of the wetland to adjacent habitats.

The intensity of impacts has been described as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable, localized within a small area, and would not affect the overall viability of wetlands in the park. Moderate impacts would be apparent and have the potential to become major impacts. Major impacts would be substantial, highly noticeable, and could become permanent.

### **Type of Impact**

Adverse impacts are those that would degrade the size, integrity, or connectivity of wetlands. Conversely, beneficial impacts would enlarge the size or enhance the integrity and connectivity of wetlands.

### ***Vegetation***

Impacts on vegetation communities were assessed in terms of duration, type, and intensity in site-specific, parkwide, and regional contexts.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

Three primary parameters were used to evaluate the intensity of impacts on vegetation: (1) changes in the size and continuity of plant communities, 2) changes in the integrity of plant communities, and 3) the resilience of affected plant communities.

The geographical extent of plant communities within the project site was determined from a geographic information system map (March 28 2002), which was produced from “The Plant Communities of Yosemite Valley – a Map and Descriptive Key” (NPS 1994b). To measure proposed development, lines were drawn around the perimeters of the sites. The area calculated includes the entire area inside the perimeter. The relative extent of a plant community was determined by comparison with similar communities within Yosemite National Park.

Human use impacts such as recreational use and foot traffic can extend beyond developed areas and affect plant community size and continuity. Human use can disturb or compact soils, create conditions favorable for non-native species or introduce non-native species, and trample native vegetation cover. Human use impacts that extend beyond development boundaries were considered as factor in determining the intensity of impacts on vegetation.

New development within an otherwise intact and undisturbed area may fragment or disassociate plant communities. Small areas of restoration surrounded by existing or new development may constitute a lesser beneficial impact on plant communities than restoration of a small area adjacent to a larger intact community. In general, reducing and limiting fragmentation, and maintaining connections within and among plant communities can minimize adverse effects on plant communities.

The evaluation of the integrity of plant communities was based on:

- Biodiversity
- Opportunities for natural processes to occur such as fire and flooding
- Exotic species introduction and spread
- Resilience of the plant community

In this document, biodiversity refers to the diversity of communities within an ecosystem, the diversity of species within a community, and genetic variation among individual species. Measures of biodiversity may include plant community structure and composition, connectivity of ecosystems, variation in age, structure (density and arrangement), individual species composition and abundance, and the presence or absence of natural structural layers.

Natural processes such as fire and flooding sustain many plant communities. This impact analysis considered whether changes would occur to opportunities for natural processes (or management options such as prescribed burning) to take place. For example, new development may prohibit opportunities for prescribed natural fire.

Non-native species can alter soil chemical and physical properties, hamper native species establishment, and ultimately alter native plant community structure and function. This impact analysis considered whether proposed actions would favor the establishment of non-native species, and the ability to contain and reverse non-native plant infestation.

Resilient plant communities are more capable of withstanding anthropogenic alteration without long-term deformation. These communities tend to be able to recover more quickly from alteration.

Negligible impacts would have no measurable or perceptible changes in plant community size, continuity, or integrity. Minor impacts would be measurable or perceptible and localized within a relatively small area and the overall viability of the plant community would not be affected. Moderate impacts would cause a change in the plant community (e.g., size, continuity, and integrity); however, the impact would remain localized. The change would be measurable and perceptible, but could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent in their effect on plant community size, diversity, continuity, or integrity.

## Type of Impact

Impacts were classified as adverse if they would reduce the size, continuity, or integrity of a plant community. Conversely, impacts were classified as beneficial if they would increase the size, continuity, or integrity of a plant community.

## Wildlife

This section addresses the effects of alternatives on wildlife and their habitat. Nearly all wildlife concerns can be addressed by considering the effects of alternatives on wildlife habitat as represented by general vegetation types. The correlation of how the vegetation impacts would affect wildlife is described within this section. Adverse effects to wildlife can also occur without modifications to wildlife habitat, and are considered herein.

In general, adverse effects on wildlife can be minimized by reducing and limiting habitat fragmentation; that is, by preserving and restoring large areas of habitat, patches of habitat, and maintaining connections within and among habitat types. Larger patches of habitat tend to support higher numbers and diversity of wildlife species than smaller ones, and connections between habitat patches enable the movement of wildlife between areas, enhancing reproduction and survival. Small patches of habitat can serve as stepping-stones for wildlife moving between larger blocks.

The value of habitat patches for wildlife is also affected by adjacent human activities and development. Severe disruption of habitat between patches can impede wildlife movements. Impacts radiating into habitat patches (referred to in the analysis as radiating impacts), such as light, noise, non-native species, and human use, can affect habitat quality. This impact is less severe in larger habitat patches because the ratio of volume to edge is greater than in smaller patches, and wildlife preserve a core of habitat that is more isolated from radiating impacts. These same factors of radiating impact also increase the effect of new development beyond the boundaries of the habitat directly affected by removal and/or modification.

Ultimately, the value of a restored area or the impact of a developed area to wildlife is determined by the characteristics of the species affected. Home range size, tolerance of human disturbance, and life-history characteristics determine whether a species reoccupies a restored area or abandons a disturbed area.

Impacts on wildlife have been assessed in terms of changes in the amount and distribution of wildlife habitat, the size and connectivity of habitat, the integrity of the site (including past disturbance), the potential for habituation of wildlife to humans, and the relative importance of habitats.

Habitat types with high value to wildlife were identified through a combination of evaluation methods. Habitat types were evaluated using the California Wildlife Habitat Relationships System based upon the number of species unique to each habitat type, the number of special status species expected in each type, and the scarcity of the habitat in the park. This model indicated that changes to two rare habitat types in the park (fresh emergent wetland and lacustrine) would have the most effect on wildlife (Chow et al. 1994). This evaluation was broadened by an overview of habitat types in the park and the Sierra Nevada that have a recognized high value to wildlife and have undergone extensive reduction and degradation. Such habitats include meadows, riparian, and California black oak woodland (NPS 1994b; UC Davis 1996) Overlaying this evaluation of habitat types, however, was an assessment of the degree to which actions increased

or decreased habitat fragmentation (the size of the area affected, its relationship and connection to other habitat areas, and the level of human disturbance that would continue to affect its quality). The home ranges of those species and their tolerance of human disturbance also affect the value of habitat areas to individual species. For instance, the restoration of a 10-acre area could increase habitat for small rodents, but probably would not substantially benefit species with relatively large home ranges such as black bears or mountain lions.

Actions were also assessed as to their potential for causing human/wildlife conflicts resulting from increased recreational disturbances in sensitive habitats such as meadows, and the introduction of unnatural food sources. Such impacts can lead to changes in animal behavior, increased mortality, and altered habitat use.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration. Construction-related impacts to wildlife end with cessation of construction activity, or soon thereafter, and include:

- Noise, dust, and light emanating from construction sites could affect the use of surrounding habitats by wildlife.
- Vegetation removed, trampled, or run-over during temporary use of some habitat as areas for staging of machinery or materials would affect wildlife until such areas could be restored after the project.
- Diversion of water flows during construction would result in unnatural drying or wetting of habitats adjacent to sites.
- Wildlife could be killed by traffic or machinery associated with construction.
- Pits and trenches could entrap wildlife, resulting in their death.
- Spills of fuel, oil, hydraulic fluid, antifreeze, and other toxic chemicals could affect wildlife, especially those in aquatic environments.
- Construction personnel, at in-park residences or at work sites, could provide a source of human food to wildlife, resulting in conditioning of wildlife and in human/wildlife conflicts.

Long-term impacts have been defined as those lasting 20 years or longer. Subsequent impact analyses focused primarily on long-term effects of implementation during the operational lifetime of the alternatives that result in changes in the abundance, diversity, and distribution of wildlife.

### **Intensity of Impact**

Negligible impacts are impacts that would not be measurable or perceptible. Minor impacts would be measurable or perceptible and would be localized within a relatively small area; however, the overall viability of the resource would not be affected. Without further impacts, negative effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized. The change would be measurable and perceptible, but negative effects could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent without active management.

## **Type of Impact**

Impacts were classified as adverse if they would negatively affect the size, continuity, or integrity of wildlife habitat, or result in unnatural changes in the abundance, diversity, or distribution of wildlife species. Conversely, impacts were classified as beneficial if they would positively affect the size, continuity, or integrity of wildlife habitat.

## ***Special-status Species***

### **Wildlife**

This analysis includes species listed under the Endangered Species Act as threatened or endangered; species that are Candidates for listing under the Endangered Species Act; species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special-status wildlife species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct physical loss or adverse modification of habitat; (3) the effective loss of habitat (through avoidance or abandonment) due to construction activity or noise, or the species' sensitivity to human disturbance.

Habitat fragmentation is also a critical factor for special-status species. Restored blocks of habitat should be large enough to support viable populations, and intact habitat should not be reduced or affected to the point that it would no longer support viable populations. A more detailed discussion of impact duration, intensity, and type is included in the preceding Wildlife section.

### **Plants**

This analysis includes species listed under the Endangered Species Act as threatened or endangered; species that are Candidates for listing under the Endangered Species Act; species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, rare, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special-status plant species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct physical loss of habitat; (3) the effective loss of habitat through loss of habitat features such as surface water flows. Impact evaluations determined the location of species in proximity to the proposed project disturbance, and assessed the sensitivity of a species to impacts (considering rarity, resilience, population size, and distribution of species throughout the park).

### ***Duration of Impact***

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### ***Intensity of Impact***

The intensity and magnitude of impacts on special-status wildlife and plant species have been described as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable, localized within a relatively small

area, and would not affect the overall viability of resources in the park; without further impacts, adverse effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality), but would remain localized; they would be readily apparent. Major impacts would be substantial, highly noticeable, and affect larger areas.

### ***Type of Impact***

Impacts were classified as adverse if they would negatively affect population size, or habitat size, continuity, or integrity of a special-status species. Conversely, impacts were classified as beneficial if they would positively affect population size, or the size, continuity, or integrity of habitat.

### ***Air Quality***

The analysis qualitatively<sup>3</sup> compares the project alternatives by evaluating air emissions from construction activities and operational activities (vehicle trips, wood burning, and space and water heating) under each alternative.

The air quality impact assessment involves the identification and qualitative description of the types of activities associated with the Yosemite Lodge Area Redevelopment that could affect air quality, corresponding emissions sources and pollutants, and relative source strengths. Based on the relative source strengths, this qualitative assessment was performed to determine the potential for higher pollutant emissions or concentrations, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact. In addition, regional pollutant transport issues are evaluated in the context of regional cumulative impacts.

The National Park Service and the Mariposa County Air Pollution Control District do not have established emissions-based criteria for evaluating the significance of project implementation impacts. In the absence of such recommendations, this analysis qualitatively evaluates the significance of project implementation impacts. The analysis of effects herein is qualitative, and professional judgment has been applied to reach reasonable conclusions as to the context, duration, and intensity of potential impacts, and whether the impacts are considered to be beneficial or adverse. When possible, mitigation measure(s) are incorporated into the project to reduce the intensity of adverse effects.

### ***Duration of Impact***

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur continuously over a relatively long period of demolition, construction, and/or restoration.

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<sup>3</sup> A quantitative analysis of air quality effects was not conducted because, although the creation of pollutants resulting from the implementation of an alternative can contribute to air quality impacts, air quality is a regional issue that is influenced by factors outside the immediate area (except for the influence of major industrial facilities or highways). For example, the California Environmental Protection Agency concluded that the ozone violations in 1995 in the southern portion of the Mountain Counties Air Basin (i.e., Tuolumne and Mariposa Counties and including Yosemite National Park) were caused by transport of ozone and ozone precursors from the San Joaquin Valley Air Basin and not by actions solely within the park.

## **Intensity of Impact**

The analysis of effects is qualitative, and professional judgment has been applied to reach reasonable conclusions as to intensity of potential impacts. Negligible impacts would not be detectable. Minor impacts would be slightly detectable in close proximity to the source. Minor adverse impacts may include introduction of air pollutants into a local area with little or no preexisting direct emissions sources except for emissions transported from other areas. Minor adverse impacts are not expected to be linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. Moderate impacts would be clearly detectable and could have an appreciable health effects, or would create objectionable odors affecting a substantial number of people. Major impacts would conflict with or obstruct implementation of the applicable air quality plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

## **Type of Impact**

Impacts were considered to be beneficial or adverse to air quality. Beneficial air quality impacts would reduce emissions or lower pollutant concentrations, while adverse impacts would increase emissions or raise pollutant concentrations.

## **Noise**

Sound impacts may occur from both transportation-related actions and from nontransportation actions. Separate methods were used to estimate impacts from each type of noise source.

## **Vehicle Noise**

The assumptions used in evaluating transportation sound impacts of the alternatives include the following:

- Sound levels produced by individual private vehicles and other traffic not related to transit and tour buses were assumed to remain similar to existing conditions. Changes in sound levels associated with traffic other than transit and buses are assumed to be caused only by changes in the volume of traffic. Other buses, such as commercial tour buses and the buses operated by the park concessioner for tours, are assumed to produce sound levels similar to existing tour buses.
- Traffic conditions on a typically busy day are assumed to represent typical conditions for the No Action Alternative. Sound impacts for alternatives are estimates of expected sound levels.
- The sound-attenuating impacts of topography and vegetation are not factored into this analysis.
- For roadways where mass transit vehicles operate, the sound impact would be a result of the transient nature of the bus sound as well as the impact of other traffic. Traffic that includes mass transit vehicles also produces discrete sound events. The impact of changes in the volume of bus traffic on the sound events experienced by a person are expressed in terms of the number of events and the relative sound level of the events compared to the ambient sound level.

### ***Duration of Impact***

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact created through permanent changes to sound levels, are expected to prevail following implementation of the alternative action. The duration of some impacts would be considered long-term but temporary if they are expected to occur continuously over a relatively long period of demolition, construction, and/or restoration.

### ***Intensity of Impact***

The level of impact (negligible, minor, moderate, or major) of sound changes from the No Action Alternative to the action alternatives was evaluated using the following definitions. A negligible impact indicates the change in sound levels would not be perceptible, and would be less than 3 dBA. A minor impact indicates the change in sound levels would be equal to 3 to 5 dBA. A moderate impact indicates the change in sound levels would be equal to 6 to 9 dBA. A major impact indicates the change in sound levels would be greater than 9 dBA.

### ***Type of Impact***

Beneficial impacts are those impacts that result in less noise (a reduction in decibels) or noise events, and adverse impacts are those impacts that result in more noise (an increase in decibels) or more noise events.

## **Nonvehicle Noise**

In the analysis of nonvehicle noise, the following definitions were used:

- Human-caused sounds are considered noise: heavy equipment (trash removal, snow removal, and construction), service vehicles (custodial, etc.), sirens, idling service vehicles, music, generators, voices and barking dogs, etc.
- Naturally occurring sounds (i.e., natural quiet) are not considered noise: running water, watercourses, wildlife, wind, etc.
- Ambient noise is the all-encompassing sound associated with a given environment, usually a composite of sound from many sources at many directions, near and far, including the specific sources of interest.

In addition, the following assumptions were used:

- There are two types of sensitive receptors of nonvehicle noise: visitors and residents; sound is considered a noise impact only if it is experienced by a noise sensitive receptor.
- A reduction in the number of people (e.g., visitors, employees, or residents) in an area generally would result in a reduction in the amount of noise (fewer voices, fewer service vehicles, less trash removal, etc.), but not necessarily a reduction in peak noise levels.
- An increase in the number of people (e.g., visitors, employees, or residents) in an area generally would result in an increase in amount of noise (more voices, more service vehicles, more trash removal, etc.), but not necessarily an increase in peak noise levels.
- A reduction in facilities (e.g., buildings, cabins, parking areas, etc.) in an area generally would result in a reduction in amount of noise (fewer voices, less heavy equipment, less trash removal, etc.), but a reduction in peak noise levels would be a function of which facilities were removed.

- An increase in facilities (e.g., buildings, cabins, parking areas, etc.) in an area generally would result in an increase in amount of noise (more voices, more heavy equipment, more trash removal, etc), but the peak noises produced would be a function of the types of facilities introduced.
- Aircraft noise would not vary among the alternatives (i.e., the aircraft noise of the No Action Alternative is the same as the aircraft noise of the two action alternatives).

A qualitative assessment of noise impacts is presented. The assessment of the action alternatives is relative to the No Action Alternative. The following types of noise associated with an activity or facility have been evaluated:

- Construction/demolition (voices, heavy equipment, tools, forestry, etc.)
- Housing (voices, service vehicles, trash removal, music, dogs, etc.)
- National Park Service and primary operations (voices, service vehicles, sirens, idling vehicles, fueling stations, snow removal, trash removal, etc.)
- Parking (voices, service vehicles, trash removal, etc.)
- Lodging (voices, service vehicles, trash removal, etc.)
- Pedestrian and hiking trails (voices, etc.)

#### ***Duration of Impact***

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact created through permanent changes to sound levels, are expected to prevail following implementation of the alternative action. The duration of some impacts would be considered long-term but temporary if they are expected to occur continuously over a relatively long period of demolition, construction, and/or restoration.

#### ***Intensity of Impact***

Negligible impacts would not be detectable. Minor impacts would be slightly detectable in close proximity to the source, but are not expected to have an appreciable effect on ambient noise levels. Moderate impacts would be clearly detectable and could have an appreciable effect on ambient noise levels; moderate adverse impacts may include introduction of noise associated with an activity or facility into an area with little or no ambient noise. Major impacts would be clearly audible against ambient noise levels; or would have a substantial, highly noticeable effect on ambient noise levels.

#### ***Type of Impact***

Beneficial impacts are those impacts that result in less noise (a reduction in decibels) or noise events, and adverse impacts are those impacts that result in more noise (an increase in decibels) or more noise events.

## **Cultural Resources**

This impact analysis methodology applies to three types of cultural resources: archeological sites, American Indian traditional resources, and cultural landscape resources (including historic sites and structures).

Section 106 of the National Historic Preservation Act requires a federal agency to take into account the effects of its undertakings on properties included in, eligible for inclusion in, or potentially eligible for inclusion in the National Register of Historic Places (cf. 36 Code of Federal Regulations [CFR] 800.16 (l)(1)), and provide the Advisory Council on Historic Preservation the reasonable opportunity to comment. A Programmatic Agreement (NPS 1999c) was developed among the National Park Service at Yosemite, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation, in consultation with American Indian tribes and the public, to take into account the effects of park planning and operations on historic properties.

The methodology for assessing impacts to historic resources is based on stipulations V through VIII of the Programmatic Agreement. This includes: (1) establishing an Area of Potential Effect; (2) assessing the background information regarding historic properties within this area and conducting any necessary surveys, inventories, and resource evaluations; (3) comparing the location of the impact area with that of resources listed, eligible, or potentially eligible for listing in the National Register of Historic Places; (4) identifying the extent and type of effects; (5) assessing those effects according to procedures established in the Advisory Council on Historic Preservation's regulations; and (6) considering ways to avoid, reduce, or mitigate adverse effects.

Cultural resource impacts in this document are described in terminology consistent with the regulations of the Council on Environmental Quality, and in compliance with the requirements of the National Environmental Policy Act, Section 106 of the National Historic Preservation Act, and the 1999 Programmatic Agreement regarding the Planning, Design, Construction, Operations and Maintenance of Yosemite National Park. The Section 106 determination of effect for the undertaking (implementation of the alternative), required by the Programmatic Agreement, is included in the "Section 106 Summary" for each alternative, presented later in this chapter.

### **Duration of Impact**

Impacts to historic properties (cultural resources) could be of short term, long term, or permanent duration. Analysis of the duration of impacts is required under National Environmental Policy Act, but is not required and is not usually considered in assessing effects in terms of National Historic Preservation Act.

### **Type of Impact or Effect**

Impacts are considered to be either adverse or beneficial to historic properties (cultural resources) when analyzed under the National Environmental Policy Act. However, impact type is not viewed this way when conducting analysis under Section 106 of the National Historic Preservation Act. For the purposes of assessing effects to historic properties under the National Historic Preservation Act, effects are either adverse or not adverse. Effects under both the National Environmental Policy Act and the National Historic Preservation Act are considered adverse when they diminish the significant characteristics of a historic property.

Impacts can be either direct or indirect. Direct impacts result from specific actions, such as demolition of historic structures. Indirect impacts generally occur after project completion, and are a result of changes in visitor-use patterns or management of resources fostered by implementation of an action.

### **Intensity of Impact**

The intensity of an impact on a cultural resource can be defined as negligible, minor, moderate, or major. Negligible impacts would be barely perceptible changes in significant characteristics of a historic property. Minor impacts would be perceptible and noticeable, but would remain localized and confined to a single element or significant characteristic of a historic property (such as a single archeological site containing low data potential within a larger archeological district, or a single contributing element of a larger historic district). Moderate impacts would be sufficient to cause a noticeable but not substantial change in significant characteristics of a historic property (such as an archeological site with moderate data potential or a small group of contributing elements within a larger historic district). Major impacts would result in substantial material alteration or destruction of the property or cause highly noticeable changes to any qualifying characteristics of a property that contribute to its historic significance (such as an archeological site with high data potential or a large group of contributing elements within a larger historic district).

Presented below are the specific discussions of duration, intensity, and type of impacts to cultural resources.

#### ***Archeological Resources***

Archeological resources are typically considered eligible for inclusion in the National Register of Historic Places because of the information they have or may be likely to yield (cf. 36 CFR 60.4).

Any change in the physical attributes of an archeological site is irreparable and considered adverse and of permanent duration. Adverse impacts to archeological resources most often occur as a result of earthmoving activities within an archeological site area, soil compaction or increased erosion, unauthorized surface collection, or vandalism. Beneficial impacts to archeological resources can occur when patterns of visitor use or management action are changed in the vicinity of archeological resources such that an ongoing impact, which would otherwise continue to degrade archeological resources, is reduced or arrested. Direct impacts can occur as a result of grading, trenching, or other activities that damage the structure of an archeological site. Indirect impacts can occur as a result of increasing visitor activity or management action in the vicinity of an archeological site, leading to things such as artifact collection, accelerated soil compaction, and erosion.

The intensity of impact to an archeological resource would depend upon the potential of the resource to yield important information, as well as the extent of the physical disturbance or degradation. For example, major earthmoving at an archeological site with low data potential might result in a minor, adverse impact. Negligible impacts would be barely perceptible and not measurable, and would usually be confined to archeological sites with low data potential. Minor impacts would be perceptible and measurable, and would remain localized and confined to archeological site(s) with low to moderate data potential. Moderate impacts would be sufficient to cause a noticeable change, and would generally involve one or more archeological sites with moderate to high data potential. Major impacts would result in substantial and highly noticeable changes, involving archeological site(s) with high data potential.

***American Indian Traditional Resources***

American Indian traditional resources are considered eligible for inclusion in the National Register of Historic Places as traditional cultural properties (or places) when: 1) a district, site, building, structure, or object is rooted in a community's history and is important for maintaining the continuing cultural identity of the community; and 2) the property (ies) meet National Register criteria for significance and integrity.

Impacts to American Indian traditional resources occur as a result of changes in the physical characteristics, access to, or use of resources, such that the cultural traditions associated with those resources are changed or lost. Beneficial impacts can occur when intrusive facilities, or visitor or management activities are removed from a traditional use area; when ecological conditions are improved at a gathering area such that the traditionally used resource is enhanced; or when access for American Indian people is enhanced. Adverse impacts occur when physical changes to a traditionally used resource or its setting degrade the resource itself, or degrade access to or use of a resource.

Impacts are considered short term if they represent a temporary change in important vegetation or temporarily restrict access to an important resource, and do not disrupt the cultural traditions associated with that resource for a noticeable period of time. They are considered long term if they involve a change in important vegetation or cultural feature, or addition of a new facility or visitor use that would change the physical character of or access to a resource for a noticeable period of time. This period of time would vary by resource type and traditional practitioners. These long-term changes would disrupt cultural tradition(s) associated with the affected resource, but the disruption would not alter traditional activities to the extent that the important cultural traditions associated with the resource are lost. Permanent impacts to American Indian traditional resources would involve irreversible changes in important resources such that the ongoing cultural traditions associated with those resources are lost.

The intensity of impacts to an American Indian traditional resource would depend on the importance of the resource to an ongoing cultural tradition, as well as the extent of physical damage or change. Negligible impacts would be barely perceptible and not measurable, and would be confined to a small area or single contributing element of a larger National Register district (such as the American Indian traditional resource landscape). Minor impacts would be perceptible and measurable, and would remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of a National Register district or property, and/or would generally involve a small group of contributing elements in a larger National Register district. Major impacts would result in substantial and highly noticeable changes in significant characteristics of a National Register district or property, and/or would involve a large group of contributing elements in a larger National Register district and/or an individually significant property.

***Cultural Landscape Resources, Including Historic Sites and Structures***

Impacts to cultural landscape resources result from physical changes to significant characteristics of a resource or its setting. Beneficial impacts can occur as a result of restoration or rehabilitation of resources, or removal of incompatible or noncontributing facilities. Direct, adverse impacts generally occur as a result of modifying a significant characteristic of a historic structure or landscape resource; removal of a significant structure or landscape resource; or addition of new, incompatible facilities in proximity to a historic site or structure. Indirect adverse impacts also

can occur following project completion. These impacts are generally associated with changes in historic vegetation, or continued deterioration of historic structures. They are considered indirect impacts, as they are not directly associated with project construction, but rather result from increased visitor use or change in management of resources fostered by the completed plan.

Impacts to historic structures and cultural landscape resources are considered short term if they involve activities such as temporary removal of vegetation or other contributing resources, road closures, or prescribed burns, where the impacts are noticeable for a period of from one to five years. Other examples of short-term Impacts to historic structures include constructing scaffolding surrounding a building during rehabilitation work, or minor deterioration in historic fabric that is repairable as part of routine maintenance and upkeep. Impacts are considered long term if they involve a reversible change, lasting from five to twenty years, in a significant characteristic of a historic structure or landscape. These changes could include such actions as alteration of contributing resources or construction of an incompatible building addition or adjacent facility. Permanent impacts to a historic structure or landscape resources would include irreversible changes in significant characteristics, such as removal of contributing resources; restoration of natural systems and features; irreversible removal of historic fabric that changes the historic character of a property; or demolition of a historic structure.

Negligible impacts would be barely perceptible and not measurable and would be confined to small areas or a single contributing element of a larger National Register district. Minor impacts would be perceptible and measurable but remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of an individually significant historic structure, or would generally involve a single or small group of contributing elements in a larger National Register district. Major impacts would result from substantial and highly noticeable changes in significant characteristics of an individually significant historic structure, or would involve a large group of contributing elements in a National Register district.

### ***Scenic Resources***

The overriding management purpose of any national park, as defined by the National Park Service 1916 Organic Act, is to conserve the scenery and natural and historic objects. Following this direction, the National Park Service determined impacts on scenic resources by examining the potential effects of the Yosemite Lodge Area Redevelopment on the landscape character and/or features and how any changes may be experienced (visibility, viewpoints, etc.).

Impacts of the Yosemite Lodge Area Redevelopment on visual resources were examined and determined by:

- Comparing the existing visual character of the landscape in terms of the color, contextual scale, and formal attributes of landscape components and features, and the degree to which actions that may result from the Yosemite Lodge Area Redevelopment would affect (i.e., contrast or conform with) that character.
- Analyzing changes in experiential factors, such as whether a given action would result in a visible change, the duration of any change in the visual character, the distance and viewing conditions under which the change would be visible, and the number of viewers that would be affected.

Scenic resources impacts consist of substantial changes that would alter (1) existing landscape character, whether foreground, intermediate ground, or background, and would be visible from viewpoints the National Park Service has established as important; (2) access to historically important viewpoints or sequence of viewpoints; or (3) the visibility of a viewpoint or sequence of viewpoints.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

The magnitude of impacts to the scenery within the view from specific vantage points and to specific scenic features is described as negligible, minor, moderate, or major as described below.

- Negligible impacts would be imperceptible or not detectable.
- Minor impacts would be slightly detectable or localized within a relatively small area.
- Moderate impacts would be those that are readily apparent.
- Major impacts would be substantial, highly noticeable, permanent, and/or result in changing the character of the landscape.

### **Type of Impact**

Impacts were evaluated in terms of whether they would be beneficial or adverse to scenic resources. Beneficial impacts would enhance the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints. Adverse impacts would be effects that reduce the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints.

### ***Visitor Experience***

Impacts on visitor experience may occur as a result of changes to road circulation, interpretation facilities, campgrounds and lodging, trails, and other facilities and resources that contribute to the type and quality of the visit to Yosemite National Park. They may also occur from direct actions altering the availability of a specific experience or activity.

Visitor experience is also directly affected by actions influencing natural resources such as, air quality, scenic resources, and cultural resources. Though impacts to these resources are not repeated in the analysis of visitor experience, enhancement or degradation of these resources also enhances or degrades the quality of the visitor experience.

Impacts on visitor experience have been assessed using professional judgment to develop a qualitative analysis of the effects of actions on the activities of different visitor populations. These conclusions have been considered in combination with data on the proportion, when known, of visitors who participate in different activities while in the park.

Assumptions used in evaluating visitor experience impacts for the alternatives include the following:

- Existing facilities have come into being in response to visitor demands and needs. This includes roads, trails, turnouts and viewpoints, and various visitor services and accommodations.
- Private vehicles are the preferred mode of travel for most visitors. However, most visitors would support use of a required transit system to bring about desired improvements in visitor experience (Gramann 1992).
- Those visitors who support these measures, and a large portion of those who have no preference or who do not support such measures, would still choose to participate in various park activities.
- Visitor activities and opportunities in the park would continue to exist, even if changes were made in modes used for moving about the park.
- Anticipated changes in visitor participation would represent an effect.
- Anticipated changes in trip quality would represent an effect.
- Anticipated changes in service level (such as reductions in accommodations or increase in services) would represent an effect.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

The intensity of impacts has been defined as negligible, minor, moderate, and major. Negligible impacts would result in little noticeable change in visitor experience. Minor impacts would result in changes in desired experiences but without appreciably limiting or enhancing critical characteristics. (Critical characteristics are those elements of a recreational activity that are most important to those who pursue it; for example, it may be important to picnickers to be able to drive to a picnic site.) Moderate impacts would change the desired experience appreciably, (i.e., changes one or more critical characteristics, or appreciably reduces/increases number of participants). Major impacts would eliminate or greatly enhance multiple critical characteristics or greatly reduce/increase participation.

Size of user groups was defined based on a percentage of visitors who participate in an activity:

- Small; less than 1% of visitors
- Moderate; 1% to 5% of visitors
- Moderately large; 6% to 19% of visitors
- Large; 20% to 49% of visitors
- Majority; 50% to 74% of visitors
- Most; 75% or more of visitors

One additional area of impact was evaluated relative to visitor experience: night sky.

## **Type of Impact**

Impacts were evaluated in terms of whether they would be beneficial or adverse to visitor experience. Beneficial impacts would enhance visitor participation, quality of visitor experience, and service level. Adverse impacts would be effects that reduce visitor participation, quality of visitor experience, and service level.

## **Night Sky**

Interior and exterior lighting of buildings and of certain infrastructure such as parking facilities are needed to accommodate visitors. This lighting has the potential to affect the ability to see the night sky and landscape. The draft “Yosemite National Park Exterior Lighting Guidelines” serve as an initial guide for preserving and restoring the night environment of the park as visitor service facilities are rehabilitated and new buildings and infrastructure are designed and built.

Potential impacts on the night sky (ability to see stars and the effect of the sky on the landscape) have been identified for the removal or addition of buildings and infrastructure for each alternative. All impacts are considered long-term. Where artificial lighting already exists within a complex, a substantial change in outdoor lighting is considered a minor long-term impact. Where artificial lighting would be substantially expanded beyond or reduced within an existing complex, the change is considered a long-term moderate impact. The addition of lighting to an area where no architectural lighting exists or removal of all architectural lighting from a distinct area is considered a long-term major impact.

The following general actions have been evaluated for their effect on the night sky environment:

- Removal or addition of vehicle parking infrastructure
- Employee housing
- Lodging
- Food, retail, and other services
- Orientation and interpretation facilities
- Parking operation support facilities
- Implementation of exterior lighting guidelines and rehabilitating existing lighting

## ***Socioeconomics***

Analysis of social and economic impacts has been included to evaluate potential effects of the alternatives on the region’s economies and on low income and minority visitor populations. Potential impacts for each of these subjects were evaluated using a methodology most appropriate to each. A summary description of methodology is shown in table E-3.

Environmental consequences of implementing the alternatives were evaluated for each of the subject areas identified above. The effects of actions associated with each alternative on these social and economic topics have been projected within the affected region. Assessments of potential social and economic impacts were based on comparisons between the No Action Alternative and the two action alternatives. The significance of these impacts was evaluated in relation to the affected environment described in Chapter III.

**Table E-3**  
**Summary of Social and Economic Impact Analysis Methodology**

Subject	Method of Analysis
Visitor population, minority and low-income visitors, and environmental justice	Current visitor demand and behavior were assumed to be unchanged. Visitation for 2001 was established as a baseline condition. Projected changes in park visitation were based on visitor service capacity changes associated with the plan. Proposed actions were evaluated to estimate, when possible, their expected effects on future visitation. Future day visitation was projected to be unchanged due to the uncertain influences of numerous factors. The identified impacts were evaluated by comparing them to the baseline conditions.
Regional economies, visitor spending, and employment	Baseline economic information on the region's economies was obtained from IMPLAN. Impacts to the Yosemite region's economy were determined based on the effects of the expected changes in visitor spending. Future total visitor spending estimates were based on the projected visitation changes and average visitor spending estimates obtained from previously published visitor surveys of Yosemite visitation and visitor behavior. Future visitor spending patterns and behavior were assumed to be unchanged from current conditions. Input-output analysis of the identified changes in regional spending was performed using IMPLAN multipliers to estimate (1) the direct and indirect impacts to economic output, and (2) future employment impacts.

### Duration of Impact

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### Intensity of Impact

The intensity of each impact was rated in terms of increasing severity, as negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and are expected to have no discernible effect on the social and economic environment. Minor impacts are slightly detectable and are not expected to have an overall effect on the character of the social and economic environment. Moderate impacts are detectable, without question, and could have an appreciable effect on the social and economic environment. Such impacts would have the potential to initiate an increasing influence on the social and economic environment (particularly if other factors have a contributing effect). Major impacts are considered to have a substantial, highly noticeable influence on the social and economic environments, and could be expected to alter those environments permanently. The impacts on the local economies were evaluated based on each alternative's projected population changes. The economic impacts of the proposed construction spending were estimated using the IMPLAN input-output model.

### Type of Impact

Impacts were recognized as beneficial if they would improve upon characteristics of the existing social and economic environment, as it relates to visitor population and regional economies. Conversely, impacts were considered adverse if they would degrade or otherwise negatively alter the characteristics of the existing environment.

## ***Transportation***

The focus of this impact assessment was on the effect of changes to overnight accommodation facilities (campgrounds and lodging), parking facilities, and access patterns in the Yosemite Lodge Area Redevelopment site on traffic volumes/circulation and associated traffic flow and safety conditions. It was assumed that Northside Drive, though realigned, would continue to accommodate through traffic flow, with capacity similar to current conditions, until the traveler information and traffic management system of the *Yosemite Valley Plan* is fully implemented. It was assumed that the plan would result in quantifiable construction activity, the effects of which were assessed.

Although quantitative analysis of potential effects was conducted for the impact assessment of the effects of changes in traffic volumes on traffic flow, the nature of analysis of effects on traffic safety (i.e., the uncertainty of consequences of an increase in potential vehicle conflicts) does not lend itself to quantification, and professional transportation engineering judgment was applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts. When possible, mitigation measure(s) were incorporated into the Yosemite Lodge Area Redevelopment to reduce the intensity of adverse effects.

### **Traffic Flow Conditions**

This section assessed potential changes in traffic volumes associated with changes to overnight accommodations and parking facilities at the Yosemite Lodge Area Redevelopment site that could result from each of the action alternatives. Changes in traffic volumes were then judged as to whether they would substantially change the levels of congestion on the roadway system serving the project area.

### **Traffic Safety/Conflicts**

This section assessed potential changes to overnight accommodations and parking facilities at the Yosemite Lodge Area Redevelopment site, and to circulation patterns (realigned Northside Drive, and location and number of facility access points) that would result from each of the action alternatives. Possible changes in the number and location of facility access points were then judged as to whether increased turning movements and changes to access locations would substantially affect the potential for traffic conflicts.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

The intensities of impacts consider whether the impact would be negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and would have no discernible effect on traffic flow and/or traffic safety conditions. Minor impacts are effects on traffic flow and/or traffic safety conditions that would be slightly detectable, but not expected to have an overall effect on those conditions. Moderate impacts would be clearly detectable and could have an appreciable effect on traffic flow and/or traffic safety conditions. Major impacts would have a

substantial, highly noticeable influence on traffic flow and/or traffic safety conditions and could permanently alter those conditions.

### **Type of Impact**

Impacts are considered in the context of being either beneficial or adverse on traffic flow and/or traffic safety conditions. Beneficial impacts would improve traffic flow and traffic safety by reducing levels of congestion and occurrences of vehicle/vehicle, vehicle/bicycle, and vehicle/pedestrian conflicts. Adverse impacts would negatively alter traffic flow and traffic safety by increasing levels of congestion and occurrences of such conflicts.

### ***Park Operations and Facilities***

Impacts for each action alternative were evaluated by assessing changes to operations and facilities that would be required to meet various operational requirements outlined in each of the action alternatives. These effects were compared to existing operations, which are described in Alternative 1.

The discussions of impacts are for those operations that would be new, undergo major operational change, or show susceptibility to increases or decreases in operational activity. For example, the increased water demand in a developed area would require increases in staffing for facilities management. For most day-to-day and programmatic activities, the action alternatives would have negligible effects, i.e., there would not be a measurable change or difference in operations. These activities were generally not included in the analysis. For example, retaining an existing picnic area, at the same size, serving the same types of user groups, and with the same types of facilities, would have negligible effects on campground maintenance operations, and thus was not included in the analysis.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

With negligible impacts, there would not be a detectable difference in park operations and facilities from existing levels. With minor impacts, there would be a slightly detectable difference in park operations and facilities, but the impacts would not be expected to have an overall effect. Moderate impacts would be clearly detectable and could have an appreciable effect. Major impacts would have a substantial, highly noticeable effect.

### **Type of Impact**

Adverse impacts represent a change that would negatively alter park operations and facilities. Beneficial impacts represent a change that would improve park operations and facilities.

## ***Hazardous Materials***

The hazardous materials discussion focused primarily on effects that hazardous materials in Yosemite National Park would have on public health and the environment under each alternative. Based on existing data, analysts identified site conditions including previous hazardous material and petroleum product spills, and the presence of hazardous materials and petroleum products (such as underground storage tanks). Some older buildings that would be demolished as a result of the project redevelopment may contain hazardous building materials. The most common hazardous materials found in older buildings are asbestos, polychlorinated biphenyls (PCBs), and lead-based paint. Potential hazards of these materials stem from improper handling or disposal. General impacts were described associated with these materials in the context of any activities in the project area.

### **Duration of Impact**

The duration of the impacts considers whether the impact would be short-term or long-term. A short-term impact would be short-lived or temporary due to construction, restoration, or demolition activities, and a long-term impact would be permanent and continual. The duration of some impacts would be considered long-term but temporary if they are expected to occur over a relatively long period of demolition, construction, and/or restoration.

### **Intensity of Impact**

Impact intensity has been characterized as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

### **Type of Impact**

All hazardous material handling and spill events are potentially hazardous. The type of impact is related to risk. In general, reducing risk would be considered a beneficial impact and increasing risk would be considered adverse. An impact associated with hazardous materials would be considered beneficial if the risk were reduced by decreasing the frequency or amount of hazardous materials used, eliminating the use of some types of hazardous materials, or decreasing the number of people using or exposed to them. In addition, beneficial impacts are those that restore natural environmental conditions (e.g., the remediation of hazardous materials spills or leaks).

Conversely, a project would be considered to have an adverse impact if it added facilities or infrastructure that required the use of hazardous materials or otherwise resulted in an increase in the frequency, quantity, or variety of hazardous materials used. An impact also would be considered adverse if it entailed the use of more toxic, flammable, reactive, or corrosive materials than previously used, or increased the number of people potentially exposed to or required to use these materials.

### **Context of Impact**

Localized impacts would occur in the immediate vicinity of an action or in a nearby area indirectly affected by the action (e.g., radiating impacts of concentrated visitor use). Regional impacts would occur over a large area, such as Yosemite Valley. Hazardous materials have the potential to cause regional impacts because they often enter surface water or groundwater and become mobile.